Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (canceled).

Claim 2 (canceled).

Claim 3 (canceled).

Claim 4 (currently amended): A method for operating a first path computation element in a first autonomous system to participate in establishing an inter-autonomous system Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) between a head-end node ~~said first autonomous system~~ and a tail-end node, said method comprising:

receiving at said first path computation element, virtual shortest path tree information from a second path computation element in a second autonomous system, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node ~~in said second autonomous system~~ and extending to one or more border routers linking said first autonomous system and said second autonomous system;

performing computations at said first path computation element, based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first autonomous system and a third autonomous system; and

sending information identifying said revised virtual shortest path tree from said first path computation element to a third path computation element in said third autonomous system;

wherein said revised virtual shortest path tree is used to compute a path of said MPLS Traffic Engineering LSP between said head-end node and said tail-end node.

Claim 5 (previously presented): The method of claim 4 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers linking said first autonomous system and said third autonomous system without identifying intermediate nodes between said one or more border routers linking said first autonomous system and said third autonomous system.

Claim 6 (previously presented): The method of claim 5 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers linking said first autonomous system and said third autonomous system and identifies intermediate nodes between said border routers linking said first autonomous system and said third autonomous system.

Claim 7 (original): The method of claim 4 further comprising:

prior to receiving said virtual shortest path tree information from said second path computation element, receiving a path computation request from said third path computation element and forwarding said request to said second path computation element.

Claim 8 (currently amended): A method for operating a first path computation element in a first autonomous system to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first autonomous system to a tail-end node in a second autonomous system, said method comprising:

receiving at said first path computation element, a path computation request from said head-end node;

transmitting at said first path computation element, said path computation request to a second path computation element in a third autonomous system bordering said first autonomous system; and thereafter

receiving at said first path computation element, virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node in said second autonomous system and extending to one or more border routers connected in both said first autonomous system and said third autonomous system;

wherein said virtual shortest path tree information is used to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 9 (canceled).

Claim 10 (currently amended): The method of ~~claim 9~~ claim 8 further comprising:

sending information identifying said computed path to said head-end node.

Claim 11 (previously presented): The method of claim 10 wherein said information identifying said computed path identifies said one or more border routers connected in both of said first autonomous system and said third autonomous system without identifying intermediate nodes between said one or more border routers connected in both said first autonomous system and said third autonomous system.

Claim 12 (previously presented): The method of claim 10 wherein said information identifying said computed path identifies said one or more border routers connected in both of said first autonomous system and said third autonomous system and intermediate nodes between said one or more border routers connected in both of said first autonomous system and said third autonomous system.

Claim 13 (currently amended): A method for operating a first path computation element in a first area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first area to a tail-end node in a second area, said method comprising:

computing at said first path computation element a virtual shortest path tree rooted at said head-end node and extending to one or more border routers connected to said first area and to a third area; and

sending information identifying said virtual shortest path tree from said first path computation element to a second path computation element ~~in a second area and~~ operating on a border router connected in both said third area and said second area;

wherein said virtual shortest path tree information is used to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 14 (previously presented): The method of claim 13 further comprising:

receiving information identifying a path of said Traffic Engineering LSP from said second path computation element; and

notifying said head-end node.

Claim 15 (previously presented): The method of claim 13 wherein said first path computation element operates on said one or more border routers connected in both said first area and said third area.

Claim 16 (currently amended): A method for operating a first path computation element connected in a first area and a second area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in a third area to a tail-end node in said first area, said method comprising:

receiving at said first path computation element, information identifying a virtual shortest path tree rooted at said head-end node and extending to one or more border routers connected in both said third area and said second area;

performing at said first path computation element, computations to extend said virtual shortest path tree through said second area and said third area; and

identifying at said first path computation element, a path for said MPLS Traffic Engineering LSP based on said extended virtual shortest path tree.

Claim 17 (previously presented): The method of claim 16 wherein receiving comprises:

receiving said information identifying said virtual shortest path tree from a second path computation element connected in both said second area and said third area.

Claim 18 (previously presented): The method of claim 16 further comprising:

sending information identifying said path for said Traffic Engineering LSP to said head-end node.

Claim 19 (canceled).

Claim 20 (canceled).

Claim 21 (canceled).

Claim 22 (currently amended): A method for operating a first path computation element in a first area to participate in establishing an inter-area Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) between a head-end node ~~said first area~~ and a tail-end node, said method comprising:

receiving at said first path computation element, virtual shortest path tree information from a second path computation element in a second area, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node ~~in said second area~~ and extending to one or more border routers linking said first area and said second area;

performing at said first path computation element, computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first area and a third area; and

sending information identifying said revised virtual shortest path tree from said first path computation element to a third path computation element in said third area;

wherein said revised virtual shortest path tree is used to compute a path of said MPLS Traffic Engineering LSP between said head-end node and said tail-end node.

Claim 23 (previously presented): The method of claim 22 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers linking said first area and said third area without identifying intermediate nodes between said border routers linking said first area and said third area.

Claim 24 (previously presented): The method of claim 23 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers linking said first area and said third area and identifies intermediate nodes between said border routers linking said first area and said third area.

Claim 25 (original): The method of claim 24 further comprising:

prior to receiving said virtual shortest path tree information from said second path computation element, receiving a path computation request from said third path computation element and forwarding said request to said second path computation element.

Claim 26 (currently amended): A method for operating a first path computation element in a first area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first area to a tail-end node in a second area, said method comprising:

receiving at said first path computation element, a path computation request from said head-end node;

transmitting at said first path computation element, said path computation request to a second path computation element in a third area bordering said first area; and thereafter

receiving at said first path computation element, virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node in said second area and extending to one or more border routers connected in both said first area and said third area;

wherein said virtual shortest path tree information is used to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 27 (canceled).

Claim 28 (currently amended): The method of ~~claim 27~~ claim 26 further comprising:

sending information identifying said computed path of said Traffic Engineering LSP to said head-end node.

Claim 29 (previously presented): The method of claim 28 wherein said information identifying said computed path identifies border routers of said path without identifying intermediate nodes between said border routers.

Claim 30 (previously presented): The method of claim 28 wherein said information identifying said computed path identifies border routers of said path and intermediate nodes between said border routers.

Claim 31 (canceled).

Claim 32 (canceled).

Claim 33 (canceled).

Claim 34 (currently amended): A computer-readable medium storing executable codes for operating a first path computation element in a first autonomous system to participate in establishing an inter-autonomous system Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) between a head-end node ~~said first autonomous system~~ and a tail-end node, comprising:

code that causes receipt of virtual shortest path tree information from a second path computation element in a second autonomous system, said virtual shortest path tree information identifying a shortest path tree rooted at said tail-end ~~in said second autonomous system~~ and extending to one or more border routers linking said first autonomous system and said second autonomous system;

code that causes performance of computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first autonomous system and a third autonomous system; and

code that causes sending of information identifying said revised virtual shortest path tree to a third path computation element in said third autonomous system;

wherein said revised virtual shortest path tree is used to compute a path of said MPLS Traffic Engineering LSP between said head-end node and said tail-end node.

Claim 35 (previously presented): The computer-readable medium of claim 34 wherein said information identifying said revised virtual shortest path tree identifies paths through border routers of said revised virtual shortest path tree without identifying intermediate nodes between said border routers linking said first autonomous system and said third autonomous system.

Claim 36 (previously presented): The computer-readable medium of claim 35 wherein said information identifying said revised virtual shortest path tree identifies paths through border routers of said revised virtual shortest path tree and identifies intermediate nodes between said border routers linking said first autonomous system and said third autonomous system.

Claim 37 (previously presented): The computer-readable medium of claim 34 further comprising:

code that, prior to receipt of said virtual shortest path tree information from said second path computation element, causes receipt of a path computation request from said third path computation element and forwarding said request to said second path computation element.

Claim 38 (currently amended): A computer-readable medium storing executable codes for operating a first path computation element in a first autonomous system to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first autonomous system to a tail-end node in a second autonomous system, comprising:

code that causes receipt of a path computation request from said head-end node;

code that causes transmission of said path computation request to a second path computation element in a third autonomous system bordering said first autonomous system; and

code that causes receipt of virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node and extending to one more border routers connected in both said first autonomous system and said third autonomous system;

wherein said virtual shortest path tree information is used to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 39 (canceled).

Claim 40 (currently amended): The computer-readable medium of ~~claim 39~~ claim 38 further comprising:

code that causes sending of information identifying said computed path to said head-end node.

Claim 41 (previously presented): The computer-readable medium of claim 40 wherein said information identifying said computed path identifies border routers of said path without identifying intermediate nodes between said border routers.

Claim 42 (previously presented): The computer-readable medium of claim 40 wherein said information identifying said computed path identifies border routers of said path and intermediate nodes between said border routers.

Claim 43 (currently amended): A computer-readable medium storing executable codes for operating a first path computation element in a first area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first area to a tail-end node in a second area, comprising:

code that causes computation of a virtual shortest path tree rooted at said head-end node and extending to one or more border routers connected to said first area and to a third area ~~between said first area and said third area~~; and

code that causes sending of information identifying said virtual shortest path tree to a second path computation element operating on a border router connected in both said third area and said second area;

wherein said virtual shortest path tree information is used to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 44 (previously presented): The computer-readable medium of claim 43 further comprising:

code that causes receipt of information identifying a path of said Traffic Engineering LSP from said second path computation element; and

code that causes notification of said head-end node of said path.

Claim 45 (previously presented): The computer-readable medium of claim 43 wherein said first path computation element operates on a border router connected in both said first area and said third area.

Claim 46 (currently amended): A computer-readable medium storing executable codes for operating a first path computation element connected in a first area and a second area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in a third area to a tail-end node in said first area, comprising:

code that causes receipt of information identifying a virtual shortest path tree rooted at said head-end node and extending to one or more border routers connected in both said third area and said second area;

code that causes performance of computations to extend said virtual shortest path tree through said second area and said third area; and

code that causes identification of a path for said MPLS Traffic Engineering LSP based on said extended virtual shortest path tree.

Claim 47 (previously presented): The computer-readable medium of claim 46 wherein said code that causes receipt comprises:

code that causes receipt of said information from a second path computation element connected in both said second area and said third area.

Claim 48 (previously presented): The computer-readable medium of claim 46 further comprising:

code that causes sending of information identifying said path to said head-end node.

Claim 49 (canceled).

Claim 50 (canceled).

Claim 51 (canceled).

Claim 52 (currently amended): A computer-readable medium storing computer codes for operating a first path computation element in a first area to participate in establishing an inter-

area Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) between a head-end node ~~said first area~~ and a tail-end node, comprising:

code that causes receipt of virtual shortest path tree information from a second path computation element in a second area, said virtual shortest path tree information identifying a shortest path tree rooted at said tail-end node ~~in said second area~~ and extending to one or more border routers linking said first area and said second area;

code that causes performance of computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first area and a third area; and

code that causes sending of information identifying said revised virtual shortest path tree to a third path computation element in said third area;

wherein said revised virtual shortest path tree is used to compute a path of said MPLS Traffic Engineering LSP between said head-end node and said tail-end node.

Claim 53 (previously presented): The computer-readable medium of claim 52 wherein said information identifying said revised virtual shortest path tree identifies paths through border routers linking said first area and said third area without identifying intermediate nodes between said border routers linking said first area and said third area.

Claim 54 (previously presented): The computer-readable medium of claim 53 wherein said information identifying said revised virtual shortest path tree identifies paths through border routers linking said first area and said third area and identifies intermediate nodes between said border routers linking said first area and said third area.

Claim 55 (previously presented): The computer-readable medium of claim 52 further comprising:

code that, prior to receipt of said virtual shortest path tree information from said second path computation element, causes receipt of a path computation request from said third path computation element and forwarding said request to said second path computation element.

Claim 56 (currently amended): A computer-readable medium storing executable codes for operating a first path computation element in a first area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first area to a tail-end node in a second area, comprising:

code that causes receipt of a path computation request from said head-end node;

code that causes transmission of said path computation request to a second path computation element in a third area bordering said first area; and

code that causes receipt of virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node and extending to one more border routers connected in both said first area and said third area;

wherein said virtual shortest path tree information is used to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 57 (canceled).

Claim 58 (previously presented): The computer-readable medium of claim 56 further comprising:

code that causes sending of information identifying said computed path to said head-end node.

Claim 59 (previously presented): The computer-readable medium of claim 58 wherein said information identifying said path identifies border routers of said computed path without identifying intermediate nodes between said border routers.

Claim 60 (previously presented): The computer-readable medium of claim 58 wherein said information identifying said path identifies border routers of said computed path and intermediate nodes between said border routers.

Claim 61 (canceled).

Claim 62 (canceled)

Claim 63 (canceled).

Claim 64 (canceled).

Claim 65 (currently amended): Apparatus for operating a first path computation element in a first autonomous system to participate in establishing an inter-autonomous system Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) between a head-end node~~said first autonomous system~~ and a tail-end node, said method comprising:

means for receiving at the first path computation element, virtual shortest path tree information from a second path computation element in a second autonomous system, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node ~~in said second autonomous system~~ and extending to one or more border routers linking said first autonomous system and said second autonomous system;

means for performing computations at the first path computation element, based on said received virtual shortest path tree information to determine a revised virtual shortest path tree,

said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first autonomous system and a third autonomous system; and

means for sending information identifying said revised virtual shortest path tree from the first path computation element to a third path computation element in said third autonomous system;

wherein said revised virtual shortest path tree is used to compute a path of said MPLS Traffic Engineering LSP between said head-end node and said tail-end node.

Claim 66 (currently amended): Apparatus for operating a first path computation element in a first autonomous system to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first autonomous system to a tail-end node in a second autonomous system, said method comprising:

means for receiving at the first path computation element, a path computation request from said head-end node;

means for transmitting at the first path computation element, said path computation request to a second path computation element in a third autonomous system bordering said first autonomous system; and

means for receiving at the first path computation element, virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node in said second autonomous system and extending to one or more border routers connected in both said first autonomous system and said third autonomous system;

wherein said virtual shortest path tree information is used to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 67 (currently amended): Apparatus for operating a first path computation element in a first area to participate in establishing an inter-area Multi-Protocol Label Switching (MPLS)

Traffic Engineering Label Switched Path (LSP) between a head-end node ~~said first area~~ and a tail-end node, said method comprising:

means for receiving at said first path computation element, virtual shortest path tree information from a second path computation element in a second area, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node ~~in said second area~~ and extending to one or more border routers linking said first area and said second area;

means for performing computations at said first path computation element, based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first area and a third area; and

means for sending information identifying said revised virtual shortest path tree from said first path computation element to a third path computation element in said third area;

wherein said revised virtual shortest path tree is used to compute a path of said MPLS Traffic Engineering LSP between said head-end node and said tail-end node.

Claim 68 (currently amended): Apparatus for operating a first path computation element in a first area to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first area to a tail-end node in a second area, said method comprising:

means for receiving at said first path computation element, a path computation request from said head-end node;

means for transmitting at said first path computation element, said path computation request to a second path computation element in a third area bordering said first area; and

means for receiving at said first path computation element, virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node in said second area and extending to one or more border routers connected in both said first area and said third area, said virtual shortest path tree rooted at the Traffic Engineering said LSP tail-end node;

wherein said virtual shortest path tree information is used to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 69 (currently amended): Apparatus for operating a first path computation element in a first autonomous system to participate in establishing an inter-autonomous system Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) between a head-end node ~~said first autonomous system~~ and a tail-end node, said method comprising:

a processor; and

a memory device that stores instructions to be executed by the processor, said instructions comprising:

code that causes receipt at the first path computation element, of virtual shortest path tree information from a second path computation element in a second autonomous system, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node ~~in said second autonomous system~~ and extending to one or more border routers linking said first autonomous system and said second autonomous system;

code that causes performance of computations based on said received virtual shortest path tree information to determine a revised virtual shortest path tree, said revised virtual shortest path tree extending from said tail-end node to one or more border routers linking said first autonomous system and a third autonomous system; and

code that causes sending information identifying said revised virtual shortest path tree to a third path computation element in said third autonomous system;

wherein said revised virtual shortest path tree is used to compute a path of said MPLS Traffic Engineering LSP between said head-end node and said tail-end node.

Claim 70 (previously presented): The apparatus of claim 69 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers linking said first autonomous system and said third autonomous system tree without

identifying intermediate nodes between said border routers linking said first autonomous system and said third autonomous system.

Claim 71 (previously presented): The apparatus of claim 69 wherein said information identifying said revised virtual shortest path tree identifies paths through said one or more border routers linking said first autonomous system and said third autonomous system and identifies intermediate nodes between said one or more border routers linking said first autonomous system and said third autonomous system.

Claim 72 (currently amended): Apparatus for operating a first path computation element in a first autonomous system to participate in establishing a Multi-Protocol Label Switching (MPLS) Traffic Engineering Label Switched Path (LSP) from a head-end node in said first autonomous system to a tail-end node in a second autonomous system, said product comprising:

a processor; and

a memory device that stores instructions to be executed by the processor, said instructions comprising:

code that causes receipt at the first path computation element, of a path computation request from said head-end node;

code that causes transmission of said path computation request to a second path computation element in a third autonomous system bordering said first autonomous system; and

code that causes receipt of virtual shortest path tree information from said second path computation element, said virtual shortest path tree information identifying a virtual shortest path tree rooted at said tail-end node in said second autonomous system and extending to one more border routers connected in both said first autonomous system and said third autonomous system;

wherein said virtual shortest path tree information is used to compute a path of said MPLS Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 73 (previously presented): The apparatus of claim 72 further comprising code that causes use of said virtual shortest path tree information to compute a path of said Traffic Engineering LSP from said head-end node to said tail-end node.

Claim 74 (previously presented): The apparatus of claim 72 further comprising code that causes sending of said virtual shortest path tree information to said head-end node.

Claim 75 (new): The method of claim 4 wherein said tail-end node is in said second autonomous system.

Claim 76 (new): The method of claim 4 wherein said head-end node is in said third autonomous system.